A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
GBMOT1-01	05/06/03	Need to come to a decision on if the electronic "PROC Execution Requests" and the "RT Command Sequences" are truly needed and can be supported by the MOC/FOT. The FOT's two primary concerns are: a. Having an operations plan where the FOT is routinely being asked to respond to commanding requests with a quick (same day) turn-around since the ops concept (and FOT staffing) is based on commanding being very preplanned (2-3 days ahead of time). b. For the RT Command Sequences, having PROC's created "on-the-fly" when the established process is to have all PROC's pre-approved and tested. c. Need some more discussion on these commanding methods.	John Nagy	12/15/03 Recommend Closing	The amount of PROC execution requests and RT command sequences will need to worked out in a Operations Agreement.
GBMOT1-02	05/06/03	Need to continue to work the concept of assigning time-stamps to ATS commands. For example, need to make sure that all components are using and recognizing the same orbital events. Where do they get documented? Is there a concern if the SSC and MOC are using different orbit propagators? If the MOC is going to also turn orbital events into time-stamps, how are the events associated with the commands or set of commands provided to the MOC by the SSS (and presumably by the IOC for test/contingency).	John Nagy	1/15/04	
GBMOT1-03	05/06/03	For stored commands, need to finalize definition of exactly what is exchanged among the IOC, SSC and MOC in terms of activities (collections of command mnemonics) vs. actual command mnemonics. One key driver seems to be to ensure that the SSC can perform science constraint checking, which may at times need to view on-board actions more at the activity level instead of the individual command level (i.e., needs to be able to see the forest and the trees).	John Nagy	1/15/04 Recommend Closing	This will be incorporated into the Ops Product ICD.

A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
GBMOT1-04	05/06/03	Need to determine how we define the amount of flexibility for ATS stored commands in terms of when they execute. Typically there will be some level of flexibility in exactly when a stored command executes on-board. BY having some flexibility, the SSC and MOC will be better able to resolve any science or command level constraint violations. Also applies to the other commanding methods, such as when a PROC should be executed or when an instrument memory load should be uplinked.	John Nagy	1/15/04	Doug asking if we are talking about load by load after time windows?
GBMOT1-05	05/06/03	Need to come to an operations agreement for how the GBM instrument will be routinely commanded. The operations concept and FOT staffing profile call for almost all routine commanding to be pre-planned (2 or more days ahead of time), and be via stored command loads and instrument memory loads. The GBM Team requested the option to also do some near real-time commanding (commands coming in the day they are needed on-board). This may be able to be handled, but only at an infrequent rate. Topic needs more discussion.	John Nagy	12/15/03	Currently discussing a concept with the GBM team for the amount and type of commanding done by stored ATS commands and real-time request.

A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
GBMOT1-06	05/06/03	May need to consider implementing a command list builder in ITOS. Ground team needs to look into what ITOS has in this area, where it would help the user build a list of commands and command parameters, with the output being an ASCII or Excel-like file. AstroRt appears to have this capability, so should look into that as well.	JD	1/15/04 Closed	J.D. comment from 1/28- ITOS has a command list builder that can be used only for generating ATS and RTS loads. It is referred to in the ITOS documentation as a Load Builder. The Load Builder presents the user with a list of commands to choose from and prompts the user to enter submnemonic values for commands that require them. ITOS does not have a command list builder for commands that are sent in real-time, however there are two ways in which similar functionality can be achieved: First, when in two-step mode, up to 64 commands can be placed into a command buffer. The command buffer may be viewed and cleared, but not edited or saved. All commands are sent sequentially when the SEND directive is issued. Secondly, a STOL procedure may be used to build and then send a list of commands. This method gives more control over the list of commands and the timing used to send them. For each of the above 2 options, ITOS does not provide the user with any direct help to identify a mnemonic or the need to add submnemonic values when defining a "command list". The MOC would benefit from the addition of a command list builder to ITOS, particularly in a testing environment; however, the benefits would probably not be significant enough to justify the cost of developing a custom solution.

A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
GBMOT1-07	05/06/03	Need to come up with a plan for how we will verify the GBM instrument portion of the Project Data Base in the MOC. The GBM team is responsible for "signing off" on the PDB, and the GBM Team and FOT will have to work together to get it validated.	Ernest Canevari	04/04	
GBMOT1-08	05/06/03	Need to find out from Spectrum on if and how they plan to ensure that the instrument-to-MOC interfaces are covered in the Observatory/MOC ICD (CDRL 4).	Mark Davis	1/15/04	
GBMOT1-09	05/06/03	Need to learn more from Spectrum about how commanding will be done in observatory I&T so that we can try to make the observatory I&T and operations environments as similar as possible. For example, we don't know how ATS loads will get built in observatory I&T in terms of incorporating instrument commands, or how instrument memory loads will be handled.	Mark Davis	1/15/04 Closed	For ATS/RTS loads, AstroRT has tools to build either type of these loads. As long as the instrument commands are in the I&T DB, they can be put into the ATS/RTS loads. For any spacecraft memory load files built in ITOS, there is a conversion tool that will convert these to AstroRT load files. For GBM instrument load files, the GBM builders have a tool that takes their binary load images and builds a Perl script full of instrument load commands that can be executed from AstroRT. Checking to see if a similar tool will exist for LAT. LAT will create loads in ITOS ASCII format.
LOT1-01	05/13-15/03	What will be the LAT FSW role be post launch?	Lori Bator	2/23/04	LOF

A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
LOT1-02	05/13-15/03	Still need to resolve if the MOC load requirements would be in a MOC to observatory ICD or in an independent IOC to MOC ICD?	John Nagy	12/15/03	The load format of the files sent to the MOC is being addressed in the Ops Data Product ICD. Description of the format of loads to the s/c will be defined in the Obs-MOC ICD (uplink format); the format, delivery mechanism, naming convention, etc of loads from the IOCs/GSSC to the MOC will be defined in the Ops Products ICD. (Doug 11/21/03)
LOT1-03	05/13-15/03	stated that events can span more than 1 packet, this contradicted an earlier discussion with Richard. We need clarification, to ensure the MOC will always deliver all of the data from any given event in one data set.	JJ Russell	2/23/04	
LOT1-04	05/13-15/03	Ground System would provide LAT operations with a definition of how table loads are verified which would show the traditional FOT methodology.	John Nagy	12/15/03	
LOT1-05	05/13-15/03	How does the LAT dump memory loads? Will a CRC check be used? Will the FOT need to dump and compare bits?	Lori Bator	3/3/04 ~~12/19/03~~	Will discuss during Ops TIM
LOT1-06	05/13-15/03	Could the LAT use the diagnostic mode to dump Housekeeping engineering data over the LVDS?	Lori Bator	2/23/04	
LOT1-07	05/13-15/03	to create telemetry drawing that shows X-band and S-band streams for GN and TDRS that shows VC assignments, APID ranges etc…	Ernest Canevari	Closed	(see LAT meeting minutes/overcome by events).
LOT1-08	05/13-15/03	Burst Alerts and instrument Alarms will use the same APIDs whether in GN or SN – are there any implications to this?	Mike Rackley	Closed	No
LOT1-09	05/13-15/03	Ensure Burst Alert Ops con contains words about how scenarios work.	John Nagy	~~??/??/??~~ Closed	Contained in Ops Concept baselined in December. ~~Not sure what "scenarios" this is referring to with respect to the Burst Alerts?~~

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A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
LOT1-10	05/13-15/03	Does the MOC get a message from the spacecraft in housekeeping telemetry or though an alert message if a ToO has been executed? What does the MOC receive from the observatory to indicate a ToO has been acted on?	Mark Davis	Closed	No Worked through all the ToO meetings we had.
LOT1-11	05/13-15/03	Could the MOC go through the SIIS to get to the LAT instrument simulator that would be in the IOC? How will it be used to validate PROCS? Need to discuss with Gunther. Need to discuss with SAI (Roger) the feasibility of interfacing directly with SIIS bypassing AstroRT.	Mark Davis	1/15/04	This action is OBE. (Per Mike Rackley email, this option is no longer being pursued).
LOT1-12	05/13-15/03	Require better link to IOC SLAC (LTB) to perform test and validation? NISN like requirement and circuit needed in GSRD	Howard Dew	12/19/03 Closed	Risk ID #6 opened
LOT1-13	05/13-15/03	Include IOC simulator in interface checklist from GSRD.	Bruce Wagner	Soon	
LOT1-14	05/13-15/03	to provide a description of the instrument simulator: EM towers, calorimeters, CASU, EPUs 1 set. Other 15 towers via computer simulation.	Dave Lung	5/26/04	
LOT1-15	05/13-15/03	to confirm if LAT IOC needs BAMs. The plan would then be to send all of the Burst Alert Messages to the GBM BAP.	Lori Bator	2/23/04	
LOT1-16	05/13-15/03	Need to verify the BAP can accept all Burst Alert Messages (LAT and GBM), re-format, perform value added application if necessary and then send to the GCN. Verified.	Bill Paciesas	Closed	
GSOT1-01	07/23/03	What is the secondary target definition and what is SAIs implementation? See MSS requirement 33237.	Mark Davis	1/15/04 Closed	Secondary target is a singular target stored in on-board FSW that can be changed by ground command. During a Pointed Observation that gets occulted, the observatory will point at the secondary target. If the secondary target is also occulted (or there is no selected secondary target), then observatory does the earth limb trace. (This was verified with the GNC lead Igor Lazbin).

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GSOT1-02	07/23/03	Spectrum will allocate the RTS locations onboard (e.g. how many, their size and who gets them).	Mark Davis	3/15/04 ~~1/15/04~~	Need to work this, will baseline it from Swift.
GSOT1-03	07/23/03	GSSC will need to know the contents of any load files. LAT currently has a description field within the file. The ICD should contain keyword that describes what is contained in the file so that it may be machine-readable. However, the GSSC expressed that the current thinking is that a human in the loop would interpret the files. As a minimum, the LAT may choose to include a keyword in the description, that states the load has an operational impact or not. David Band, Lori Bator and Rob Preece will ensure that ideas for the associated load files to the GSSC will contain the desired information.	Robin Corbet	5/1/04	Working group formed to resolve this issue.
GSOT1-04	07/23/03	Need copy of the LAT FSW telecommand document date June 2003. Tony Waite (LAT) will provide to Erik Andrews so that it can be forwarded to Mike Rackley. – Delivered and distributed.	Erik Andrews	Closed	
GSOT1-05	07/23/03	to distribute updates to naming conventions.	Ross	Closed	
GSOT2-01	10/28/03	to inquire why separation takes so long.	Mark	1/15/04 Closed	There is a 50 minute LV coasting period before separation. This coasting is during the Hohmann transfer part of the orbit. SECO-2 occurs just several minutes before separation, and it's this second burn that circularizes the orbit. See the figure in the appendix.
GSOT2-02	10/28/03	to inquire when instrument simulators are expected at SAI and initial database input.	Mike Rackley	2/5/04	Closed to Risk #2
GSOT2-03	10/28/03	to review MOC release development plan and schedule to ensure reflection of availability of complete system in MOC facility	Doug	~~Recommend closure.~~Closed	MOC Release Plan reviewed with Mike, Dennis, Howard 12/19/03. Revised MOC release dates reflected in schedule.
GSOT2-04	10/28/03	to determine amount of independence FOT will have with HotBench.	Mark Davis	1/15/04 Closed	Since there's only one Hotbench, Spectrum needs to be in control of configuration on the Hotbench, so one Spectrum person would need to be at Hotbench at all times.

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GSOT2-05	10/28/03	to talk to Lisa and get a feel for how much time she had to put into the Swift MOR and how much support she needed from others at Spectrum.	Mark Davis	1/15/04 Closed	Swift MOR took a significant effort on Lisa's part. She had two separate sections that she wrote and presented, "Observatory Overview" which had 16 charts, and "L&EO" which had 20 charts. The observatory overview section had 1 to 2 charts on each subsystem, so that required review from subsystem engineers. All the charts would require review from systems engineering. Then there are dry runs to participate in, and she also had to help review the charts that the other team members were developing, such as normal operations and instrument operations. The amount of time that goes into preparing for an MOR is probably comparable to preparing for a PDR or CDR.
GSOT2-06	10/28/03	to include drawing for ETE tests.	Bruce	12/5/03 ~~Recommend closure.~~ Closed	Included.
GSOT2-07	10/28/03	will develop requirements for instrument simulation capabilities on MTS. Work with GSOM to incorporate with other comments.	John N.	Closed	Closed due to Risk #02 Hoping to re-route to someone else. Should be someone from the Project office not a MOC/FOT duty. JD distributed draft instrument simulator requirements on 12/12/03
GSOT2-08	10/28/03	will incorporate comments and take to CDRL meeting.	Ross	Closed	

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GSOT2-09	10/28/03	to create draft list of tools to be provided that will integrate with ITOS to troubleshoot diagnostic data.	Mark Davis	5/1/04 1/15/04	2/5/04 – Mark will supply additional information. For Swift, there were a few ITOS tools developed by Spectrum Astro that were needed for I&T, since Swift used ITOS for I&T. For GLAST, AstroRT is used during I&T, so there's no need to develop any ITOS tools at Spectrum Astro. So any ITOS tools will need to come from Omitron.
GSOT2-10	10/28/03	~~what are command echoes?~~Describe the s/c command echo capability.	Mark Davis	1/15/04 Closed	The on-board command log stores the actual bits of the telecommand, but not in the representation that was uplinked. The uplinked telecommands are inserted into transfer frames, randomized by AstroRT/ITOS and put into CLTUs. The only thing that FSW stores is the unrandomized telecommand packet (CCSDS telecommand source packet). The time received and the receipt source is also stored.
GSOT2-11	10/28/03	to confirm that time stamp on commands is time of execution.	Mark Davis	1/15/04 Closed	The receipt time is indicated, see AI-10 answer.
GSOT2-12	10/28/03	Verify if filtering is done on the generation side or the dump side	Mark D.	1/15/04 Closed	There are two separate concepts. One is enabling/disabling real-time downlink of logged event messages. The second is filtering what messages get logged. Fatal and error message cannot be filtered, which means they will always be logged. The ground has the choice of whether event messages are downlinked real-time, or only through stored telemetry.
GSOT2-13	10/28/03	Confirm which channel S-band diagnostic comes down on?	Mark D.	3/15/04 1/15/04	Related to #13, working this with the C&DH, FSW, systems folks.
GSOT2-14	10/28/03	Update VCID table containing FOT mark-ups with Jonathan Yount.	Mark D.	3/15/04 1/15/04	Working this with the C&DH, FSW, systems folks.

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GSOT2-15	10/28/03	to propose how to document the tools and their functions being provided by Spectrum and the MOC interface to the tools.	Doug	2/5/04 Closed	Will be in the Ops Data Products ICD or Flight Ops Manual. Not sure exactly what this is. If Spectrum provides the MOC with a tool needed for ops, the MOC expects appropriate users guide to be delivered with the tool. If this is talking about Spectrum tools that need to interface with the MOC to receive data, that would need to be specified in the Ops Products ICD. Identification of the tools should be in the MOC SOW under GFE.
GSOT2-16	10/28/03	will close issue by switching HK and Diagnostic. HK =224, Diag = 96 for both LAT and GBM.	Mark Davis	3/15/04 1/15/04	Tim Morse at SAI can submit an ICN to change these allocations in the instrument ICDs. He'll need info on what to change, and rationale. LAT team needs to verify that they do need this allocation, and provide the ICN rationale.
GSOT2-17	10/28/03	to investigate how LAT is planning on populating APIDS and what they will use Diagnostic APIDs for.	Ross	3/15/04	
GSOT2-18	10/28/03	V~~to v~~erify with LAT if they are issuing alert data on separate VC~~VC11~~.	Ross	Closed	Yes all real-time alerts go on the alert virtual channel.
GSOT2-19	10/28/03	Investigate if and how any diagnostic data needs to be handled/processed in real-time.	Mark Davis	3/15/04 1/15/04	Diagnostic data does come down in real-time, need to get more info on the real-time handling process
GSOT2-20	10/28/03	to inquire as to why VC10 is called out separately from VC1.	Mark Davis	3/15/04 1/15/04	Same as #14

A.I. #	Date	Action	Assignment	Due Date/ Status	Comments
GSOT2-21	10/28/03	to inquire if FOT can command MAF with MAR is still supported and at what rate. How is rate determined for MA?	Mark Davis	1/15/04	Need to look into some more. Issue is can MA rate be selected from ground. Can you change the default rates for DAS service? Operators can initiate HK downlink on MA with a command. Currently, only 1 kbps is in requirements, so no capability to change MA rates.
GSOT2-22	10/28/03	Howard has action to determine Ku-band FE requirements	Howard	12/19/03 Closed	Peer Review scheduled for 2/12.
GOWG-1	11/13/03	Contingency ground station trade study	Howard	12/12/03 Closed	Packaged delivered to Project.
GOWG-2	11/13/03	Network diagram for GLAST Project	Howard	1/16/04 Closed	Distribued
GOWG-3	11/13/03	Burst Alert Telemetry latency allocation diagram	Howard	12/5/03 Closed	Diagram submitted 12/4/03, CLOSED.
GOWG-4	11/13/03	Finalize network bandwidths for support of LAT 4X rate increase	Howard	1/16/04 Closed	Closed to Risk #6
GOWG-5	11/13/03	Determine security considerations of using VPN or not for science data connections between IOCs and MOC	Howard	3/15/04 1/16/04	
GOWG-6	11/13/03	Determine if upgrade cost for GN stations will be covered by Code 450	Howard	4/1/04 12/5/03	~~GN upgrade is going to be covered by Code 450, CLOSED.~~
GOWG-7	11/13/03	Provide ground station configurations to GLAST Systems	Howard	1/16/04 Closed	
GOWG-8	11/13/03	Determine if S-band GN will interfere with S-band SN at any time by looking into modulation techniques between the two stations	Howard	3/1/04 1/16/04	
GOWG-9	11/13/03	Provide Ku-band front-end requirements for purchase purposes	Howard	1/16/04 Closed	Duplicate or GSOT2-22.

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GOWG-10	11/13/03	Determine security considerations of all networked connections	Howard	1/16/04 Closed	Delete. Will be done as part of design
GSOT3-1	12/16/03	Could Code 582 take the LAT FSW and create a simulator?	Mike Rackley	Closed	Risk #2
GSOT3-2	12/16/03	Look with Dave/JJ/Eliot to understand when LAT FSW would be available for GS/Ops to be able to use.	Eric Andrews	3/3/04	
GSOT3-3	12/16/03	To confirm if Spectrum will provide HotBench training.	Mark Davis	3/15/04	
GSOT3-4	12/16/03	To work with Spectrum network guru to develop network topology with associated security.	Howard Dew & Mark Davis	3/15/04	
GSOT3-5	12/16/03	Determine security issues connecting Spectrum and MOC.whether MOC workstations at Spectrum will be behind a firewall and how accessible they will be to the MOC.	Howard Dew	3/15/04	
GSOT3-6	12/16/03	How will MOC get Ku Band data from Spectrum? Want to have a GFEP at Spectrum. Can MOC access the GFEP?	Howard Dew & Mark Davis	3/15/04	
GSOT3-7	12/16/03	Mark Davis to investigate how many TDRSSs can be stored on board.	Mark Davis	3/15/04	
GSOT3-8	12/16/03	Request that Burst alert packet contains the bus acknowledgement that repoint has been accepted.	Eric Andrews & David Band	3/15/04	
GSOT3-9	12/16/03	To provide drawing of activity flow timeline.	Ernest Canevari	~~Recommend closing~~ Closed	The timeline was created and distributed. See 12/18/03 e-mail.
GSOT3-10	12/16/03	To provide GANT chart of the process and timing for generating a weekly ATS load.	Jonathan DeGumbia	~~Recommend closing~~ Closed	The Gantt chart was created and distributed. Comments have been received and updates distributed. See 12/19/03 e-mail. The timeline will be included in discussions of the GSSC-MOC working group.
MISC-1	1/24/04	To verify that the SAI contract specifies that maintenance will be provided on the MTS and CTS simulators.	John Teter		

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MISC-2	1/24/04	To follow-up with Joy Bretthauer to confirm any SAI contract impacts on MTS and CTS delivery date changes proposed by the ground team.	John Teter		
GOWG-11	12/14/03	To confirm any link requirements necessary for the backup BAP at the GBM IOC.	Mike Rackley & Ross Cox		
GOWG-12	12/14/03	To determine if GBM will require derived parameters. ITOS currently cannot support derived parameters.	Bill P.		
GOWG-13	12/14/03	To determine if and what are the impacts on ITOS to handle a GBM epoch roll-over.	FOT		
GOWG-14	12/14/03	Review MSS for missing requirements.	Howard Dew & Ross Cox		
GOWG-15	1/29/04	To draft a proposed agenda for the Ops TIM to be held following the LAT Peer Review.	Dave Lung & Lori Bator		
GOWG-16	1/29/04	To characterize the performance of the network (internet) link between GSFC and SLAC.	Howard Dew & Richard	Closed	Closed to Risk #6

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GSOT2-01:

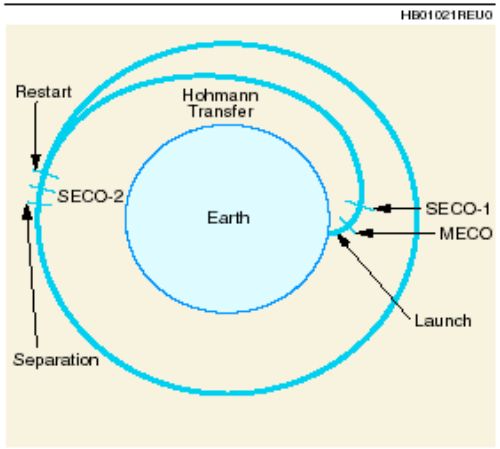

Figure 2-1. Typical Two-Stage Mission Profile

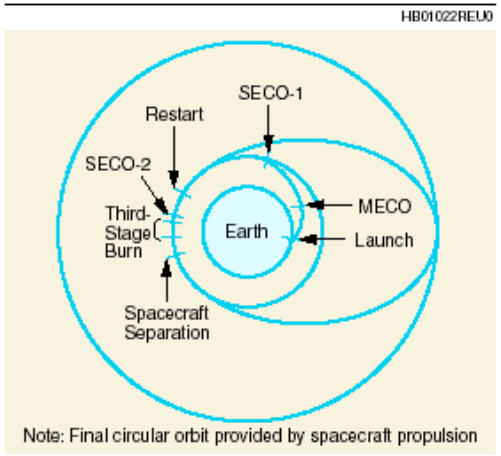

Figure 2-2. Typical Three-Stage Mission Profile

2.2.1 First-Stage Flight Profiles

GBMOTx – GBM Ops TIM
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GOWGx - GOWG